ClinicalEvidence

Bites (mammalian)

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ABSTRACT

INTRODUCTION: Mammalian bites are usually caused by dogs, cats, or humans, and are more prevalent in children (especially boys) than in adults. Animal bites are usually caused by the person's pet and, in children, frequently involve the face. Human bites tend to occur in children as a result of playing or fighting, while in adults they are usually the result of physical or sexual abuse. Mixed aerobe and anaerobe infection is the most common type of infection, and can occur in up to half of human bites. METHODS AND OUTCOMES: We conducted a systematic review and aimed to answer the following clinical questions: What are the effects of interventions to prevent complications of mammalian bites? What are the effects of treatments for infected mammalian bites? We searched: Medline, Embase, The Cochrane Library, and other important databases up to October 2009 (Clinical Evidence reviews are updated periodically, please check our website for the most up-to-date version of this review). We included harms alerts from relevant organisations such as the US Food and Drug Administration (FDA) and the UK Medicines and Healthcare products Regulatory Agency (MHRA). RESULTS: We found five systematic reviews, RCTs, or observational studies that met our inclusion criteria. We performed a GRADE evaluation of the quality of evidence for interventions. CONCLUSIONS: In this systematic review we present information relating to the effectiveness and safety of the following interventions: antibiotic prophylaxis (human bites, non-human bites), antibiotics, debridement, decontamination, irrigation, primary wound closure, and tetanus vaccination (after mammalian bites).

QUESTIONS

INTERVENTIONS

Footnote

*No RCT evidence, but there is consensus that treatment is likely to be beneficial.

Key points

- Mammalian bites are usually caused by dogs, cats, or humans, and are more prevalent in children (especially boys) than in adults.

  Animal bites are usually caused by the person's pet and, in children, frequently involve the face.

  Human bites tend to occur in children as a result of playing or fighting, while in adults they are usually the result of physical or sexual abuse.

  Physical and psychological trauma are the most common sequelae of a bite wound.

  Up to 18% of wounds may develop a bacterial infection with a mixture of aerobic and anaerobic organisms. *Pasteurella* species are pathogens of particular note.

  Methicillin-resistant *Staphylococcus aureus* (MRSA) is being increasingly reported in infections associated with domestic animal contact.

- There is consensus that tetanus immunisation should be given routinely as part of wound care of mammalian bites, but we found no studies assessing the benefit of this strategy.

  Immunisation does not need to be performed if there is a record of tetanus immunisation having been given in the previous 5 years.

- Antibiotics may prevent infection in high-risk bites to the hand, but we don't know if it is worth giving prophylactic antibiotics after other types of mammalian bites.

  High-risk bites are those with deep puncture or crushing, with much devitalised tissue, or those that are dirty.

Bites that occurred less than 24 hours previously, or those with only simple epidermal stripping, scratches, and abrasions, are unlikely to benefit from antibiotic treatment.

- There is consensus that wound debridement, irrigation, decontamination, and primary wound closure are beneficial in reducing infection, but we don't know this for sure.
- There is consensus that antibiotics help cure infected bite wounds, although we found few studies.

  Selection of appropriate antibiotics depends on the likely mouth flora of the biting animal and the skin flora of the recipient, and can be based on samples of infected material examined by microscopy and culture.

  Antibiotics with activity against *Pasteurella multocida* should be selected for empirical treatment of infected bite wounds.

  There is consensus that rabies prophylaxis should be given after all animal bites in areas where rabies is known to exist, and after bat bites in all areas of the world.

Clinical context

DEFINITION

Bite wounds are mainly caused by humans, dogs, or cats. They include superficial abrasions (30–43%), lacerations (31–45%), and puncture wounds (13–34%). [1]

INCIDENCE/ PREVALENCE

It is estimated that up to 2% of the population of western countries are victims of a dog attack every year. [2] Up to 3 in 1000 people present to emergency departments in western countries with dog-bite injuries annually. [3] In the USA, an estimated 3.5 to 4.7 million dog bites occur each year, [4] and bite wounds account for about 1% to 2% of all emergency department visits annually in the USA, costing over US $100 million annually. [5] [6] These figures are likely be even higher in developing countries where dog-control laws are seldom enacted or enforced. About one in five people bitten by a dog seek medical attention, and 1% of those require admission to hospital. [2] [7] Between one third and one half of all mammalian bites occur in children. [8]

AETIOLOGY/ RISK FACTORS

In more than 70% of cases, people are bitten by their own pets or by an animal known to them. Males are more likely to be bitten than females, and are more likely to be bitten by dogs, whereas females are more likely to be bitten by cats. [4] One study found that children under 5 years old were significantly more likely than older children to provoke animals before being bitten. [9] Human bites are the most prevalent mammalian bites after those of dogs and cats, accounting for up to 2% to 3% of mammalian bites. [5] [10] Human bites commonly occur in children as a result of fighting or playing. In adults, bites commonly occur during physical or sexual abuse. [10] Tooth abrasions to the knuckles (or "clenched fist injuries") can occur during fist fighting. [5]

PROGNOSIS

In the USA, dog bites cause about 20 deaths a year, with similar rates estimated in other developed countries. [11] [3] Bite wounds not only cause significant scarring, but may involve injury to underlying structures such as joints, tendons, nerves, or blood vessels. In children, dog bites frequently involve the face, potentially resulting in severe lacerations and scarring, as well as significant psychological trauma. [12] [13] Up to 18% of animal bite wounds may become secondarily infected. [14] [5] One study of infected dog and cat bites found that the most commonly isolated species was *Pasteurella multocida*, followed by *Streptococcus*, *Staphylococcus*, *Moraxella*, *Corynebacterium*, and *Neisseria*. [14] [15] Mixtures of aerobic and anaerobic bacteria were the norm. [5] Other significant pathogens of note are *Eikenella corrodens* in human-bite wound infections and *Capnocytophaga canimorsus* after dog bites, which can cause severe systemic infection in immunocompromised people. Rodent bites may transmit *Streptobacillus moniliformis*, the cause of rat-bite fever. Methicillin-resistant *Staphylococcus aureus* (MRSA) is being increasingly reported and may become an emerging pathogen in domestic-animal bite injuries. Human bites, particularly those to the hand, are often complicated by infection. One study reported infection in 48% of untreated bites to the hand. [10] *Eikonella corrodens* may be associated with subsequent infection of tendon sheaths and joints. Transmission of blood-borne viruses such as HIV, hepatitis B, and hepatitis C have rarely been reported in association with human-bite injuries; screening and counselling appropriate to the circumstance of the injury is recommended. Rabies, a life-threatening viral encephalitis, may be contracted as a consequence of being bitten or scratched by a rabid animal. More than 99% of human rabies occurs in developing countries where canine rabies is endemic. [16] Transmission of rabies from domestic animals such as dogs and cats to humans is extremely rare in the USA, Europe, and Canada. The incidence of rabies transmission in dog bites sustained in Africa, Southeast Asia, and India is significantly higher. [17] Bats are now implicated more commonly in transmission of rabies or the similar lyssa virus infection. Monkey bites from old-world macaques may transmit *Herpes simiae* (B virus) which can cause a fatal encephalitis in humans.

AIMS OF INTERVENTION

To prevent or achieve rapid resolution of complications after mammalian bites, with minimal adverse effects.

OUTCOMES

Prevention of complications: Rate of infection after mammalian bites, incidence of tetanus.
Treatment of infected bites: Cure rate of infection due to mammalian bites.

METHODS

Clinical Evidence search and appraisal October 2009. The following databases were used to identify studies for this systematic review: Medline 1966 to October 2009, Embase 1980 to October 2009, and The Cochrane Database of Systematic Reviews 2009, Issue 4. An additional search within The Cochrane Library was carried out for the Database of Abstracts of Reviews of Effects (DARE) and Health Technology Assessment (HTA) database. We also searched for retractions of studies included in the review. Abstracts of the studies retrieved from the initial search were assessed by an information specialist. Selected studies were then sent to the contributor for additional assessment, using pre-determined criteria to identify relevant studies. Study design criteria for inclusion in this review were: published systematic reviews of RCTs and RCTs in any language. We also included prospective and retrospective cohort studies with a control group and 20 or more participants for the following options where no RCTs were found and in which an RCT would be unethical/unlikely — "debridement, irrigation, and decontamination" option, "immunisation against tetanus" option, and "antibiotics for treating infected bites" option (i.e., for the comparison antibiotics versus placebo). RCTs had to be at least single blind for antibiotic options — open studies were acceptable for other options — and contain 20 or more individuals, of whom 80% or more were followed up. There was no minimum length of follow-up required to include studies. For antibiotic options we excluded all studies described as "open", "open label", or not blinded. We included systematic reviews of RCTs and RCTs where harms of an included intervention were studied applying the same study design criteria for inclusion as we did for benefits. In addition, we use a regular surveillance protocol to capture harms alerts from organisations such as the US Food and Drug Administration (FDA) and the UK Medicines and Healthcare products Regulatory Agency (MHRA), which are added to the reviews as required. To aid readability of the numerical data in our reviews, we round many percentages to the nearest whole number. Readers should be aware of this when relating percentages to summary statistics such as relative risks (RRs) and odds ratios (ORs). We have performed a GRADE evaluation of the quality of evidence for interventions included in this review (see table, p 9). The categorisation of the quality of the evidence (into high, moderate, low, or very low) reflects the quality of evidence available for our chosen outcomes in our defined populations of interest. These categorisations are not necessarily a reflection of the overall methodological quality of any individual study, because the *Clinical Evidence* population and outcome of choice may represent only a small subset of the total outcomes reported, and population included, in any individual trial. For further details of how we perform the GRADE evaluation and the scoring system we use, please see our website (www.clinicalevidence.com).

QUESTION What are the effects of measures to prevent complications from mammalian bites?

OPTION DEBRIDEMENT, IRRIGATION, AND DECONTAMINATION

We found no clinically important results from RCTs or cohort studies assessing debridement, irrigation, decontamination measures, or infiltration of serum into the wound in the treatment of people with bites. However, there is consensus that such measures are likely to be beneficial.

For GRADE evaluation of interventions for bites (mammalian), see table, p 9 .

Benefits: We found no systematic review, RCTs, or good cohort studies.

Harms: We found no evidence.

Comment: **Clinical guide:**
It would be regarded as unethical to conduct an RCT comparing debridement, irrigation, and decontamination versus no treatment, because there is consensus that such measures are likely to be beneficial. Copious irrigation with saline (minimum amount of 1 L) has become standard.

OPTION PRIMARY WOUND CLOSURE

Infection rates
Compared with no closure Primary closure of a wound in people with dog bites may be no more effective at reducing infections (low-quality evidence).

Note
There is consensus that primary closure of most bite wounds is likely to be beneficial and does not increase the risk of subsequent infection.

For GRADE evaluation of interventions for bites (mammalian), see table, p 9 .

Benefits: We found no systematic review. We found one RCT comparing primary wound closure versus no closure. [18] The trial excluded wounds that were infected at presentation, required plastic surgery, or involved other structures such as nerve, tendon, joint, or bone. All wounds were debrided and irrigated, and tetanus immunisation was updated, but no antibiotic prophylaxis was given. In uncomplicated lacerations, closure was performed by an experienced nurse; in complicated lacerations, closure was performed by a specialist physician. The RCT found no significant difference in the incidence of infection with closed compared with open wounds (96 people bitten by dogs in the preceding 24 hours; incidence of infection: 7/92 [7.6%] with closed *v* 6/77 [7.8%] with open; RR 0.98, 95% CI 0.33 to 2.62; timescale not reported). There was a significantly higher proportion of infections of the hand compared with the rest of the body (69% with closed *v* 31% with open), but there was no difference between closure and non-closure groups in the rate of hand infection (5/9 [56%] with closed *v* 4/9 [44%] with open). [18]

Harms: The RCT did not report on adverse effects. [18]

Comment: Although the RCT found no increased risk of infection with primary wound closure, further RCTs are required to confirm this conclusion, and also to evaluate if wound closure of bites from a rabid animal may increase the risk of rabies. Wound morphology was poorly described in this study.

Clinical guide:
Although evidence is limited in this arena, it has long been thought that primary closure of most bite wounds is likely to be beneficial and does not increase the risk of subsequent infection. The clinician should practise good wound care, including copious irrigation and debridement of devitalised tissue, as necessary, prior to closure. The wound should be re-examined 1 to 2 days after initial visit.

OPTION ANTIBIOTIC PROPHYLAXIS FOR NON-HUMAN BITES

Infection rates
Antibiotics compared with placebo Prophylaxis with antibiotics may be no more effective at reducing rates of infection in people with mammalian bites (very low-quality evidence).

For GRADE evaluation of bites (mammalian), see table, p 9 .

Benefits: We found one systematic review, which compared prophylactic antibiotics versus placebo or no treatment. [6] There was significant heterogeneity between trials. The review found no significant difference in infection rate with antibiotic prophylaxis compared with placebo after dog, cat, or human bites (search date 2001; 7 RCTs and 1 quasi-randomised controlled trial; 522 people bitten by dogs, cats, or humans in the preceding 24 hours; OR of infection 0.49, 95% CI 0.15 to 1.58; timescale not reported). When the results were analysed for each wound site (hands, trunk, arms, or head/neck), antibiotic prophylaxis significantly reduced infections of the hand only (3 RCTs: 2% with antibiotic prophylaxis *v* 28% with control; OR 0.10, 95% CI 0.01 to 0.86; NNT 4, 95% CI 2 to 50). The review found no significant effect of wound type (lacerations, puncture, or avulsions) on efficacy of antibiotics in preventing infection compared with control groups (puncture lesions, 2 RCTs, 30 people: OR 0.22, 95% CI 0.05 to 13.67; lacerations, 2 RCTs, 129 people: OR 0.80, 95% CI 0.05 to 13.67; avulsion wounds, 2 RCTs, 71 people: OR 1.07, 95% CI 0.11 to 10.63). [6] The review found no significant difference in infection rate with antibiotic prophylaxis compared with control in people who had been bitten by dogs (6 RCTs, 463 people, infection rate: 10/225 [4.4%] with antibiotic prophylaxis *v* 13/238 [5.5%] with control; OR 0.74, 95% CI 0.30 to 1.85). The review identified one small RCT of cat bites (12 people), which found antibiotic prophylaxis significantly reduced infection rates compared with control (0/5 [0%] with antibiotic prophylaxis *v* 4/6 [67%] with control; P = 0.045). There is no further description of wound severity in this review.

Harms: The systematic review did not report on adverse effects. [6]

Comment: Most of the RCTs reported by the review were small and gave insufficient information about allocation concealment and randomisation. Some studies were not double blind, and four studies had withdrawal rates greater than 10%. [6]

Clinical guide:
Two articles have called into question the value of treating all mammalian bite wounds that are of low risk of infection with antibiotics. [5] [10] Prophylactic antibiotics should be considered for high-risk bites (such as bites on the hand). [5] The efficacy of antibiotic prophylaxis for low-risk bites less than 24 hours after injury remains unclear. For now, the clinician should consider prophylactic antibiotics where there is deep puncture, crushing bites where much devitalised tissue exists, and for overtly dirty bites. Bites that appear to involve simply epidermal stripping, or scratches and abrasions, are not likely to benefit from prophylactic antibiotics.

OPTION ANTIBIOTIC PROPHYLAXIS FOR HUMAN BITES

Infection rates
Antibiotics compared with placebo We don't know whether prophylaxis with antibiotics may be more effective at reducing rates of infection in people with human bites (very low-quality evidence).

For GRADE evaluation of interventions for bites (mammalian), see table, p 9 .

Benefits:

Human bites:
We found one systematic review [6] and one subsequent RCT [10] comparing antibiotic use in people following a human bite. The review included one RCT of human bites comparing oral cephalosporin versus intravenous cephalosporin plus penicillin versus placebo. It found that antibiotic prophylaxis by either route significantly reduced the proportion of people with wound infection compared with placebo (48 people with uncomplicated bites on the hand in the preceding 24 hours; 0/33 [0%] with oral or intravenous antibiotic prophylaxis *v* 7/15 [47%] with placebo; P less than 0.05; timescale not reported). [6] The subsequent RCT found no significant difference between a cephalexin/penicillin combination and no treatment in rate of infection after 96 hours (127 people attending an emergency department with a low-risk human bite [not on hands or feet, or over cartilaginous areas] sustained in the previous 24 hours; rate of infection: 0/63 [0%] with antibiotics *v* 1/62 [1.6%] with placebo; reported as not significant; P value not reported). [10] None of the people in this study required wound closure or admission for treatment.

Harms:

Human bites:
Neither the review nor the subsequent RCT reported on adverse effects. [6] [10]

Comment:

Most of the RCTs were small and gave insufficient information about allocation concealment and randomisation. Some studies were not double blind, and four studies had withdrawal rates greater than 10%. [6]

Clinical guide:
Two articles have called into question the value of treating all mammalian bite wounds that are of low risk of infection with antibiotics. [5] [10] Prophylactic antibiotics should be considered for high-risk bites (such as bites on the hand). [5] The efficacy of antibiotic prophylaxis for low-risk bites less than 24 hours after injury remains unclear. For now, the clinician should consider prophylactic antibiotics where there is deep puncture, crushing bites where much devitalised tissue exists, and for overtly dirty bites. Bites that appear to involve simply epidermal stripping, or scratches and abrasions, are not likely to benefit from prophylactic antibiotics.

OPTION IMMUNISATION AGAINST TETANUS

We found no direct information from RCTs or cohort studies about the effects of tetanus toxoid or tetanus immunoglobulin in preventing tetanus in people after human or animal bites. There is clinical consensus that tetanus immunisation should be given routinely as part of wound care for mammalian bites.

For GRADE evaluation of interventions for bites (mammalian), see table, p 9 .

Benefits:

Tetanus toxoid:
We found no systematic review, RCTs, or cohort studies (see comment below).

Tetanus immunoglobulin:
We found no systematic review, RCTs, or cohort studies (see comment below).

Harms:

Tetanus toxoid:
We found no evidence.

Tetanus immunoglobulin:
We found no evidence.

Comment:

Clinical guide:
Immunisation against tetanus using tetanus toxoid is routinely given as part of wound care for bites. Therefore, an RCT comparing tetanus immunisation versus no immunisation would be considered unethical. It is difficult to assess whether a mammalian bite wound is any more tetanus prone than that of a non-bite laceration; both may be colonised with *Clostridium tetani* spores, although this is not a reliable indicator as to whether tetanus will develop. As with the care of any wounds, people with mammalian bites should be assessed for tetanus immunisation status, and immunised if they do not have current anti-tetanus coverage. Because bites are considered to be "dirty", if there is

no record of tetanus vaccination in the previous 5 years, administration of the vaccine on the day of presentation is called for.

The United States Surgical Infection Society guidelines recommend that tetanus toxoid booster be given to all people with acute soft-tissue injury and no tetanus immunisation in the previous 5 years. [19] The guidelines identified one RCT (1998 people with acute wounds; 163 [8%] with bites), which reported that 90% of people attending academic emergency departments in the USA for wound care had anti-tetanus antibody concentrations above the protective cut-off value of 0.1 IU/mL. The review commented that recommendations for immunisation should be followed despite this, as there is wide variation in individual antibody responses and the duration of immunity after tetanus immunisation. [19]

QUESTION What are the effects of treatments for infected mammalian bites?

OPTION ANTIBIOTICS FOR TREATING INFECTED BITES

We found no direct information from RCTs about whether antibiotics are better than no active treatment for infected mammalian bites. However, there is consensus that antibiotics are likely to be beneficial.

For GRADE evaluation of interventions for bites (mammalian), see table, p 9 .

Benefits: **Antibiotics versus placebo:**
We found no systematic review or RCTs.

Harms: **Antibiotics versus placebo:**
We found no evidence. See harms under comparative effectiveness of different antibiotics, p 6 .

Comment: None.

Clinical guide:
Evidence on the efficacy of antibiotics for the treatment of infected mammalian bites is limited. We found no RCTs comparing antibiotics versus placebo for infected mammalian bites; however, there is consensus that they are likely to be beneficial. Selection of appropriate antibiotics should take into account the organisms known to cause bite wound infections, such as *Pasteurella* species and polymicrobial mixtures of organisms including anaerobes, as well as the mouth flora of the biting animal and human skin flora of the recipient.

OPTION COMPARATIVE EFFECTIVENESS OF DIFFERENT ANTIBIOTICS

Treatment failure
Penicillin (with or without dicloxacillin) compared with amoxicillin–clavulanic acid (co-amoxiclav) Penicillin (with or without dicloxacillin) may be no more effective at reducing failure rates in people with infected and uninfected animal and human bites (very low-quality evidence).

For GRADE evaluation of interventions for bites (mammalian), see table, p 9 .

Benefits: **Comparison of different antibiotics:**
We found no systematic review but found one RCT comparing penicillin with or without dicloxacillin versus amoxicillin–clavulanic acid (co-amoxiclav). [16] Treatment was given for 5 days in people bitten less than 8 hours previously or in those without clinical infection (34 people), and for 10 days in people bitten more than 8 hours previously or with clinical infection (27 people). All wounds received usual care and were left closed or open at the discretion of the attending physician. The RCT found no significant difference in failure rate (which was undefined) with penicillin/dicloxacillin compared with amoxicillin–clavulanic acid (61 people bitten in the preceding 10 days; 48 by animals, 13 by humans; failure rate: 1/31 [3%] with penicillin/dicloxacillin *v* 3/30 [10%] with amoxicillin–clavulanic acid; RR 0.32, 95% CI 0.03 to 2.54; timescale not reported). The RCT did not include a description of bite severity and was in a mixed population both with and without clinically apparent infection.

Harms: Adverse effects were significantly more common in people using amoxicillin–clavulanic acid (co-amoxiclav) compared with penicillin/dicloxacillin (3/30 [10%] with penicillin/dicloxacillin *v* 13/31 [42%] with amoxicillin–clavulanic acid; RR 4.2, 95% CI 1.5 to 7.4; NNH 3, 95% CI 2 to 19). Diarrhoea was the most common adverse event (1/30 [3%] with penicillin/dicloxacillin *v* 9/31 [29%] with amoxicillin–clavulanic acid; RR 8.71, 95% CI 1.34 to 23.3; NNH 4, 95% CI 1 to 79). [16]

Comment: Interpretation of the results of the RCT is difficult because the main outcome measure of "failure rate" was not defined. Also, failure rates were not separated according to whether people had infected or uninfected wounds at inclusion. [16] We found no RCTs comparing antibiotics versus placebo for infected mammalian bites; however, there is consensus that they are likely to be beneficial.

Clinical guide:
Evidence on the efficacy of antibiotics for the treatment of infected mammalian bites is limited. Selection of appropriate antibiotics should take into account the organisms known to cause bite wound infections, such as *Pasteurella* species and polymicrobial mixtures of organisms including anaerobes, as well as the mouth flora of the biting animal and human skin flora of the recipient. Where it is prevalent in human and domestic animal populations, MRSA may need to be taken into account when choosing an antibiotic. Specimens of infected material should be taken for culture and susceptibility testing, and the empirical antibiotic regimen adjusted accordingly. It should be remembered that *Pasteurella* species are susceptible to penicillins, but not to first-generation cephalosporins, isoxazolyl penicillins such as cloxacillin and flucloxacillin, macrolides, or lincosamides; treatment failures have been reported when these agents have been used. [20]

GLOSSARY

Abrasion The scraping or rubbing away of a small area of skin or mucous membrane.

Avulsion A wound resulting from the ripping or tearing away of a part.

Debridement The removal of crushed, dirty, or devitalised tissue from a wound.

Laceration Occurs when the skin, soft tissues, or both are torn by the crushing and shearing forces produced on impact; characterised by ragged, irregular margins, surrounding contusion, marginal abrasion, and tissue bridging in the wound depths. Uncomplicated lacerations are linear, not contaminated by dirt, with no devitalisation of the wound edges, and present to the physician within a few hours of occurrence.

Primary wound closure The closing or suturing of a wound at the time of initial inspection by a healthcare provider.

Puncture A wound caused by perforation of the skin with a sharp point.

Low-quality evidence Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low-quality evidence Any estimate of effect is very uncertain.

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Bites (mammalian)

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Competing interests: DL and CD declare that they have no competing interests.

Disclaimer

TABLE **GRADE evaluation of interventions for Mammalian bites**

Important outcomes	Treatment, complications, adverse effects								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
What are the effects of measures to prevent complications from mammalian bites?									
8 (997) [6] [10]	Infection rates	Antibiotics *v* placebo for non-human bites	4	–3	–1	0	0	Very low	Quality points deducted for poor follow-up, uncertainties about allocation concealment, blinding, and randomisation. Consistency point deducted for heterogeneity between studies
14 (697) [6] [10]	Infection rates	Antibiotics *v* placebo for human bites	4	–3	–2	0	0	Very low	Quality points deducted for incomplete reporting of results, poor follow-up, uncertainties about allocation concealment, blinding, and randomisation. Consistency points deducted for heterogeneity between studies and conflicting results
1 (96) [18]	Infection rates	Primary wound closure *v* no closure	4	–1	0	–1	0	Low	Quality point deducted for sparse data. Directness point deducted for uncertainty about type of wound
What are the effects of treatments for infected mammalian bites?									
1 (61) [5]	Treatment failure rate	Penicillin (with or without dicloxacillin) *v* amoxicillin–clavulanic acid	4	–1	0	–2	0	Very low	Quality point deducted for sparse data. Directness points deducted for uncertainty about wound type or outcome measurement

Type of evidence: 4 = RCT; 2 = Observational; 1 = Non-analytical/expert opinion.
Consistency: similarity of results across studies.
Directness: generalisability of population or outcomes.
Effect size: based on relative risk or odds ratio.